

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) ~~Method-A method~~ for identifying a specific image (11) and/or a specific audiovisual sequence (2) within ~~any said~~ flow (3) of said images (6) or said audiovisual sequences (7), and in particular with the prospect of being able to identify a proprietary image (4) within the flow (3) and/or of being able to identify a plurality of said proprietary audiovisual sequences (5) within the flow (3);

the method comprising ~~the-a step~~ of calculating, for each said image (6), an index appearing in the form of a ordered and finite set (21) of values, and in particular in the form of a characteristic vector (9), encoding the content of the image (6); the index calculation process being hereinafter called the indexing process (39);

the method comprising at least one of:

the step of calculating a reference index (10), using the indexing process (39) for the specific image (11), or

the step of extracting said reference indexes (10) from the specific audiovisual sequence (2), so as to form a reference set (30) of said reference indexes (10);

in such a way that said reference indexes (10) characteristic of the specific image (11) and/or of the specific audiovisual sequence (2) are thus obtained;

the method additionally comprising the step of calculating an index for the current images (13) of the flow (3), using the indexing process (39) for the current images (13) of the flow (3); the index being hereinafter called the current index (14);

the method additionally comprising the step of comparing the reference indexes (10) with the current index (14) of the current image (13) of the ~~monitored~~-flow (3);

~~characterized in that, the method being such that~~wherein, the indexes appearing in the form of ~~said~~-ordered and finite sets (21a, 21b) of values identified, in the reference index (10)

and the current index-(14), by a system of coordinates-(22), itthe method additionally comprises the following steps:

the step of defining, for a given coordinate-(24) of the system of coordinates-(22), a pair of values-(25, 26), of which:

[[•]] the-a first value-(25) of the pair of values is the value appearing in the reference index-(10) associated with the given coordinate-(24), and of which:

[[•]] thea second value-(26) of the pair of values is the value appearing in the current index-(14) associated with the given coordinate-(24),

the step of calculating the-a bidimensional histogram-(27) of the pairs of values-(25, 26) obtained for all the coordinates of the system of coordinates-(22) of the reference index-(10) and of the current index-(14),

the step of calculating the-a discrete entropy of the bidimensional histogram, hereinafter called the entropy of the bidimensional histogram-(28),

the step of calculating the-a discrete entropy of the distribution of the values of the reference index-(10) or of the current index-(14); the discrete entropy of the distribution of values or the discrete entropy of the current index being hereinafter called the reference marginal entropy-(50a) or the current marginal entropy-(50b) respectively;

in such a way thatwherein:

the comparison time is thus optimized; and

in such a way that it is thus possible the reference marginal entropy value or the current marginal entropy value is configured to be added to the reference index or the current index, respectively to add this marginal entropy value to the index;

~~the step of calculating a comparison distance-(29) between a-the reference index-(10) and a-the current index-(14), using the reference marginal entropy-(50a), the current marginal entropy-(50b) and the entropy of the bidimensional histogram-(28);~~

~~the step of detecting whereby a specific image-(11) is detected within a-the flow-(3), thanks-to-using the comparison distance, with great precision and extremely fast speed, while being robust during major photometric alterations.~~

2. (Currently Amended) ~~Method-A method~~ in accordance with claim 1; the method being such that, to calculate wherein the calculation of at least one of an index of a image-(6), and in particular a-the reference index-(10) and/or a-the current index-(14), it comprises the step of resampling the image-(6) as an image with fixed dimensions in advance; the resampled image being hereinafter called the normalized image-(16);

the method additionally comprising, if the image-(6) is a color image comprising levels of colors, ~~the-a~~ step of converting the levels of colors of the image-(6) to be resampled to levels of grayscale beforehand;

wherein the normalized image-(16) ~~being-is~~ represented by a matrix-(19) of said pixel values-(17) after discrete quantization of the pixel values;

the method additionally comprising ~~the following steps:~~

~~the step of arranging the values according to a predetermined running order of the positions-(18) in the matrix-(19), and in particular by concatenating the values of each line of the matrix-(19) in the form of a characteristic vector-(9), so as to obtain the index.~~

3. (Currently Amended) ~~Method-A method~~ in accordance with one of the claims 1 and 2; wherein the step of calculating a-the comparison distance-(29) between a-the reference index-(10) and a-the current index-(14) ~~being-is~~ performed by forming ~~the-a~~ ratio between ~~the-a~~ sum of the reference marginal entropy-(50a) and of the current marginal entropy-(50b) reduced by the entropy of the bidimensional histogram-(28) as the numerator and ~~the-a~~ sum of the reference marginal entropy-(50a) and the current marginal entropy-(50b) as the denominator.

4. (Currently Amended) ~~Method A method~~ in accordance with claim 3; the method being such that wherein, to extract the reference indexes-(10) of the specific audiovisual sequence-(2) from the specific audiovisual sequence-(2), ~~it~~ the method additionally comprises the following steps:

the step of initializing a reference set-(30) containing the reference indexes-(10) of the specific images-(11) with the reference index-(100) of ~~the~~ a first specific image-(110) of the specific audiovisual sequence-(2); the reference index-(100) of the first specific image-(110) of the specific audiovisual sequence-(2) constituting ~~the~~ a first reference index of the reference set-(30);

the method additionally comprising:

(a) the step of calculating, for each said specific image-(11) of the specific audiovisual sequence-(2), a temporary current index-(31) and of calculating a comparison distance-(29) between the temporary current index-(31) and ~~the~~ a last reference index-(32) added to the reference set-(30),

(b) the step of comparing the comparison distance-(29) between the temporary current index-(31) and the last reference index-(32) added to the reference set-(30) to a predetermined threshold SE-(33);

(c) the step of adding the temporary current index-(31) to the reference set-(30), if the comparison distance-(29) exceeds the predetermined threshold SE-(33); the temporary current index-(31) becoming the last reference index-(32) of the reference set-(30);

the method additionally comprising the step of repeating the steps (a) through (c) up to the end of the specific audiovisual sequence-(2).

5. (Currently Amended) ~~Method A method~~ in accordance with any of the claims 1-or 2 through 4; the method being such that, for wherein the step of comparing the reference indexes-(10) with the current index-(14) of the current image-(13) of the monitored flow-(3), it additionally further comprises the step of comparing the comparison distance-(29) to a further predetermined threshold SF-(65);

~~in such a way that wherein~~ in the case of any said flow-(3) of said images-(6) the specific image-(11) is detected provided that the comparison distance-(29) between the reference index-(10) of the specific image-(11) and the current index-(14) is less than the further predetermined threshold SF-(65).

6. (Currently Amended) ~~Method A method~~ in accordance with claim 4, the method being ~~more particularly~~ designed for detecting a specific audiovisual sequence-(2) within any said flow-(3) of said audiovisual sequences-(7), the method comprising the following steps of:

(a) the step of initializing a variable T-(34) at -1, the step of initializing a variable D-(35) at 0,

(b) the step of calculating, for each said reference index-(10) of the reference set-(30), the comparison distance-(29) between the reference index-(10) of the reference set-(30) and the current index-(14); ~~in such a way that wherein~~ if the comparison distance-(29) is less than a predetermined threshold SD-(59), the variable D-(35) is increased by one; the condition being hereinafter called the condition for detecting said reference indexes-(10);

the method being such that the moment when the first said reference index-(10) of the reference set-(30) of the specific audiovisual sequence-(2) meets the detection condition is hereinafter called the moment of the first detection;

the method additionally comprises the following steps:

(c) the step of assigning to the variable T-(34) the time elapsed since the moment of the first detection if the variable D-(35) is different from zero,

(d) the step of repeating step (b) until the variable D-(35) reaches the predetermined threshold SD-(59); or of repeating step (a) if the variable T-(34) exceeds a predetermined threshold ST-(60),

(e) the step of detecting the specific audiovisual sequence-(2) if the variable D-(35) reaches the predetermined threshold SD-(59).

7. (Currently Amended) System-A system for identifying a specific image-(11) and/or a specific audiovisual sequence-(2) within ~~any said-a flow-(3) of said-images-(6) or said audiovisual sequences-(7), and in particular with the prospect of being able to identify a proprietary image-(4) within the flow-(3) and/or of being able to identify a plurality of said proprietary audiovisual sequences-(5) within the flow-(3);~~

the system comprising at least one of:

~~said-first calculation means-(38) for calculating a reference index-(10) for the specific image-(11), using a indexing process-(39), or~~

~~said-first computer analysis means-(40) for extracting said-reference indexes-(10) from the specific audiovisual sequence-(2), so as to form a reference set-(30) of said-reference indexes-(10);~~

the system additionally comprising:

~~said-reception means-(41) for receiving the flow-(3) of said images-(6) or said audiovisual sequences-(7) comprising at least one said-specific image-(11) and/or at least one said-specific audiovisual sequence-(2),~~

~~said-computer processing means-(42) for digitizing the flow-(3) of said images-(6) or said audiovisual sequences-(7);~~

~~the system being characterized in that, wherein the reference index-(10) appearing is in the form of a-an ordered and finite set-(21a) of said-values-(20a), and in particular in the form of a-characteristic vector-(9a), encoding the content of the specific image-(11);~~

~~in such a way that whereby a reference index-(10) characteristic of the specific image-(11) and/or of the specific audiovisual sequence-(2) is thus obtained;~~

the system additionally comprising:

said-second calculation means-(43) for calculating a current index-(14) for said-current images-(13) of the flow-(3), using the indexing process-(39) for the current images-(13) of the flow-(3);

the current index-(14) appearing in the form of a ordered and finite set-(21b) of values, and in particular in the form of a characteristic vector-(9b), encoding the content of the current image-(13);

the system additionally comprising:

said-comparison means-(44) for comparing the reference index-(10) of the specific image-(11) with the current index-(14) of the current image-(13) of the monitored flow-(3);

the first calculation means-(38) additionally comprising said-reference processing means-(49a) for calculating the discrete entropy of the distribution of the values of the reference index-(10); the entropy being hereinafter called the reference marginal entropy-(50a);

in such a way that wherein the comparison time is thus optimized; and

in such a way that this said the reference marginal entropy value-(50a) can thus is configured to be added to the reference index-(10);

the second calculation means-(43) additionally comprising said-current processing means-(49b) for calculating the discrete entropy of the distribution of the values of the current index-(14); the discrete entropy of the distribution of the values of the current index being hereinafter called the current marginal entropy-(50b);

in such a way that wherein the comparison time is thus optimized; and

in such a way that this the current entropy value can thus is configured to be added to the current index-(14);

~~the system being such that wherein, the reference indexes-(10) and the current indexes-(14) appearing are in the form of said ordered and finite sets-(21a, 21b) of values identified, in the reference index-(10) and the current index-(14), by a system of coordinates-(22); and~~

~~it-the system additionally comprises said third calculation means-(52) for:~~

defining, for a given coordinate-(24) of the system of coordinates-(22), a pair of said values-(25, 26), ~~of which thea first value-(25) is theo of the pair being a value appearing in the reference index-(10) associated with the given coordinate-(24), and of which thea second value-(26) is theo of the pair being a value appearing in the current index-(14) associated with the given coordinate-(24),~~

calculating ~~the-a~~ bidimensional histogram-(27) of the pairs of values-(25, 26) obtained for all the coordinates of the system of coordinates-(22) of the reference index-(10) and the current index-(14),

calculating ~~the-a~~ discrete entropy of the bidimensional histogram, hereinafter called the entropy of the bidimensional histogram-(28),

calculating a comparison distance-(29) between ~~a-the~~ reference index-(10) and ~~a-the~~ current index-(14), using the reference marginal entropy-(50a), the current marginal entropy-(50b) and the entropy of the bidimensional histogram-(28),

detecting ~~whereby~~ a specific image-(11) within ~~a-the~~ flow-(3) ~~is detected~~ with great precision and ~~extremely fast speed~~, while being robust during major photometric alterations.

8. (Currently Amended) ~~System-A system~~ in accordance with claim 7, ~~the system being such that wherein~~ the first calculation means-(38) for calculating a reference index-(10) of a specific image-(11) comprises:

~~said-sampling means-(45) for resampling the specific image-(11) as a resampled specific image with fixed dimensions-in advance,~~

~~said-means for discrete quantization-(46) of the pixel values of the specific image-(11) resampled in such a way that wherein the resampled specific image-(11) resampled is represented by a matrix-(19) of the pixel values-(17), after discrete quantization;~~

~~said-sequencing means-(47) for arranging the pixel values-(17) according to a predetermined running order of the positions-(18) in the matrix-(19), and in particular by concatenating the values of each line of the matrix-(19) in the form of a characteristic vector-(9a), so as to obtain the reference index-(10);~~

wherein the system additionally ~~comprising~~comprises, if the specific image-(11) is a color image-(6) comprising including levels of colors, ~~said~~ conversion means-(48) for converting the levels of colors of the specific image-(11) to be resampled to levels of grayscale beforehand.

9. (Currently Amended) ~~System A system~~ in accordance with any of the claims 7 and 8; ~~the system being such that, wherein~~ the second calculation means-(43) for calculating a current index-(14) of a current image-(13) comprises:

said-current image sampling means-(45) for resampling the current image-(13) as a current image-(13) with fixed dimensions ~~in advance~~,

said-current image quantization means for discrete quantization-(46) of the pixel values of the current image-(13) ~~in such a way that wherein~~ the resampled current image-(13) is represented by a matrix-(19) of the pixel values-(17), after discrete quantization;

said-current image sequencing means-(47) for arranging the pixel values of the current image according to a predetermined running order of the positions-(18) in the matrix-(19),

~~and in particular by concatenating the values of each line of the matrix-(19) in the form of a characteristic vector-(9b), so as to obtain the current index-(14);~~

wherein the system additionally ~~comprising~~comprises, if the current image-(13) is a color image-(6) comprising including levels of colors, said current image conversion means-(48) for converting the levels of colors of the current image-(13) to be resampled to levels of grayscale beforehand.

10. (Currently Amended) ~~System-A system~~ in accordance with one of the claims with claims 7 or 8 through 9, in which the third calculation means calculate the comparison distance-(29) between a~~the~~ reference index-(10) and a~~the~~ current index-(14), by forming the~~a~~ ratio between the~~a~~ sum of the reference marginal entropy-(50a) and of the current marginal entropy-(50b) reduced by the entropy of the bidimensional histogram-(28) as the numerator and the~~a~~ sum of the reference marginal entropy-(50a) and the current marginal entropy-(50b) as the denominator.

11. (Currently Amended) System in accordance with claim 10; ~~the system being such that~~ wherein, to extract the reference indexes-(10) of said specific audiovisual sequence-(2) from the specific audiovisual sequence-(2), made up of said specific images-(11), it~~the system~~ additionally comprises said fourth calculation means-(53) using a calculation algorithm-(54) comprising a step of initializing a reference set-(30) containing the reference indexes-(10) of the specific images-(11) with the reference index-(100) of the first specific image-(110) of the specific audiovisual sequence-(2); the reference index-(100) of the first specific image-(110) of the specific audiovisual sequence-(2) constituting the first reference index of the reference set-(30);

the calculation algorithm-(54) additionally comprising:

(a) ~~the step of calculating, for each said specific image-(11) of the specific audiovisual sequence-(2), a temporary current index-(31) and of calculating a comparison distance-(29) between the temporary current index-(31) and the a last reference index-(32) added to the reference set-(30);~~

(b) ~~the step of comparing the comparison distance-(29) between the temporary current index-(31) and the last reference index-(32) added to the reference set-(30) to a predetermined threshold SE-(33);~~

(c) ~~the step of adding the temporary current index-(31) to the reference set-(30), if the comparison distance-(29) exceeds the predetermined threshold SE-(33); the temporary current index-(31) becoming the last reference index-(32) of the reference set (30); and~~

the calculation algorithm (54)-additionally comprising the step of repeating the steps (a) through (c) up to the end of the specific audiovisual sequence (2).

12. (Currently Amended) ~~System-A system~~ in accordance with ~~any of the claims claim 10 or 11; the system being such that, wherein~~ the third calculation means (52) compares the comparison distance (29) between the reference indexes (10) and the current index (14) of the current image (13) of the monitored flow (3) to a further predetermined threshold SF (65); and

~~in such a way that wherein~~ in the case of ~~any~~ said flow (3) of said images (6), the specific image (11) is detected provided that the comparison distance (29) between the reference index (10) of the specific image (11) and the current index (14) is less than the further predetermined threshold SF (65).

13. ~~System-A system~~ in accordance with claim 11, ~~the system being more particularly designed for detecting a specific audiovisual sequence (2) within any said flow (3) of said audiovisual sequences (7);~~

the system comprising:

~~said initialization means (57) for loading:~~

~~the\_a\_value -1 in a first register T (55), and~~

~~the\_a\_value 0 in a second register D (56);~~

the system additionally comprising ~~said~~ fifth calculation means (58) for calculating, for each said reference index (10) of the reference set (30), ~~the a further comparison distance (29) between the reference index (10) of the reference set (30) and the current index (14); in such a way that wherein if a condition is met where~~ the comparison distance (29) is less than a predetermined threshold SD (59), the second register D (56) is increased by one; the condition being hereinafter called the condition for detecting said reference indexes (10);

the system being such that wherein the a moment when the first reference index-(10) of the reference set-(30) of the specific audiovisual sequence-(2) meets the detection condition is hereinafter called the moment of the first detection;

the fifth calculation means-(58) being equipped for loadingconfigured to load, in the first register T-(55), the time elapsed since-at the moment of the first detection if the value stored in the second register D-(56) is different from zero;

the fifth calculation means-(58) being equipped for repeatingconfigured to repeat the calculation of the comparison distance-(29), until the value stored in the second register D-(56) reaches the predetermined threshold SD-(59), or for repeating the use of the initialization means-(57) if the value stored in the first register T-(55) exceeds a predetermined threshold ST-(60),

in such a way thatwhereby the specific audiovisual sequence-(2) is detected if the value stored in the second register D-(56) reaches the predetermined threshold SD-(59).